

Abstract

Some epidemiological studies report associations between drinking water disinfection byproducts (DBPs) and adverse reproductive/developmental effects, e.g., low birth weight, spontaneous abortion, stillbirth, and birth defects. Using a multigenerational rat bioassay, we evaluated an environmentally relevant "whole" mixture of DBPs representative of chlorinated drinking water, including unidentified DBPs as well as realistic proportions of known DBPs at low-toxicity concentrations. Source water from a water utility was concentrated 136-fold, chlorinated, and provided as drinking water to Sprague-Dawley rats. Timed-pregnant females (P0 generation) were exposed during gestation and lactation. Weanlings (F1 generation) continued exposures and were bred to produce an F2 generation. Large sample sizes enhanced statistical power, particularly for pup weight and prenatal loss. No adverse effects were observed for pup weight, prenatal loss, pregnancy rate, gestation length, puberty onset in males, growth, estrous cycles, hormone levels, immunological end points, and most neurobehavioral end points. Significant, albeit slight, effects included delayed puberty for F1 females, reduced caput epididymal sperm counts in F1 adult males, and increased incidences of thyroid follicular cell hypertrophy in adult females. These results highlight areas for future research, while the largely negative findings, particularly for pup weight and prenatal loss, are notable.